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(54) Title: OXYGEN-RESISTANT HYDROGENASES AND METHODS FOR DESIGNING AND MAKING SAME

**(57) Abstract:** The invention provides oxygen-resistant iron-hydrogenases ([Fe]-hydrogenases) for use in the production of H<sub>2</sub>. Methods used in the design and engineering of the oxygen-resistant [Fe]-hydrogenases are disclosed, as are the methods of transforming and culturing appropriate host cells with the oxygen-resistant [Fe]-hydrogenases. Finally, the invention provides methods for utilizing the transformed, oxygen insensitive, host cells in the bulk production of H<sub>2</sub> in a light catalyzed reaction having water as the reactant.

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